RESTRICTED CIRCULATION

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Effective Transpiration Averages, 1941-70

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Averages of Effective transpiration (the sum of the potential transpirations when the SMD within the shallow root zone is less than 2 inches) have previously been obtained from monthly average rainfalls and average potential transpirations. This will overestimate the true average found from considering the mean of a series of yearly effective transpirations.

Use has been made of the Tech Bull 24 working data to extract the true 1941-1970 averages and their standard deviations.

It was found that as long as the limiting deficit of 2 inches was reached in using the long term averages, so that the effective transpiration so obtained was less than the sum of the 6 months potential transpirations, then the true average bore a very constant relationship with that obtained in the "short-cut" method. The mean percentages were North 88.9, W Mids 88.8, E Mids 88.7, East 88.9, Southeast 89.3, Southwest 89.2 and Wales 88.3, with very little variation about these means.

The true average can therefore be obtained (for the lower rainfall stations) in the simple manner (using long-term averages of R and PT) and correcting by a factor 0.89 in England and 0.88 in Wales.

For the higher rainfall stations, the percentage of true to "simple" average was fitted to the following regression.

$$\text{Percentage} = 0.01\,R - 0.84\,PT + 94$$

where R = average annual rainfall in millimetres
and PT = average summer PT in inches

The multiple correlation was 0.88.

The standard deviations of the true effective transpiration averages (ET) had a high correlation with the ratio of ET/PT, namely -0.87 and the following equation is suggested for use.

$$SD = 4.6 - 3.6\,\frac{ET}{PT}$$

Any comments or suggestions on this paper should be referred to the author.

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